

LEVELIZED COST COMPARISON OF
KANSAS WIND, ILLINOIS WIND AND ADVANCED COMBINED CYCLE

ASSUMPTIONS:

- Based on the latest Wind Technologies and Market Report, installed costs for wind was set at \$1750/kW in 2012 dollars for both Kansas and Illinois Wind. No regional cost differences included
- Advanced CT and CC were based on the most recent EIA capital cost estimates in 2012 dollars.
- All fixed and variable O&M cost were based on Mr. Berry's values for 2012.
- Inflation rates used were based on EIA's (Energy Information Information's) forecast in its 2015 update by comparing real and nominal dollars for the AEO (Annual Energy Outlook) Henry Hub price forecasts
 - 1.32% from 2012 to 2019
 - 1.63% from 2019 to 2034
 - 1.72% from 2034 to 2049
- Mr. Berry's costs for natural gas and CO2 cost were used with CO2 costs modified for the above inflation rates.
- Property tax was added to the last 15 years for the Kansas wind alternative.
- Cost for DC transmission includes a likely 20% cost overrun from Grain Belt's estimate.

ANALYSIS:

- Levelized Costs were calculated using analysis that is typically applied for regulated utilities. This analysis includes
 - Return on Net Investment using the same rates as Mr. Berry
 - Return of Gross Investment using straight-line depreciation
 - Property Taxes where applicable using Mr. Berry's property tax formulas
 - Income Taxes using the same rates as Mr. Berry
 - Fixed and Variable O&M Expense
 - Fuel and CO2 Expenses
 - DC Transmission Costs with a 20% adder
- A capacity adder using the levelized cost of and Advanced CT was added to the cost of the wind alternatives to give equivalent capacities to the Advanced CC unit.

RESULTS:

The results show Combined Cycle generation is only slightly ~~lower~~ higher than Kansas Wind at a 52% capacity factor with the addition of ~~\$22.35~~ \$21.49/MWh in DC transmission costs. Illinois Wind at a 40% capacity factor with added property tax expense in the first 10 years of operation appears to be a little higher than the other alternatives. But all three alternatives are strong competitors for meeting capacity and energy needs for Illinois utilities.

Table 1

Levelized Cost Comparisons

Generation Type	Kansas Wind	Illinois Wind	Advanced CC
CF	52.00%	40%	87%
Capacity Costs	\$35.81	\$46.56	\$13.87
Property Taxes	\$2.15	\$10.81	\$2.99
Annual Expenses	\$7.90	\$10.26	\$65.65
Capacity Adder	\$21.56	\$28.03	\$0.00
DC Transmission	<u>\$21.49</u>	\$0.00	\$0.00
CO2 Adder	\$0.00	\$0.00	\$11.69
DC Losses	<u>\$4.68</u>	\$0.00	\$0.00
Total Lev \$/MWh	<u>\$93.59</u>	\$95.66	\$94.20

REMOVAL OF CAPACITY ADDER: WIND-ON-WIND COMPARISON

If the combined cycle alternative is removed, the capacity adder can then be removed from both wind alternatives. Removal of the capacity adder lowers the cost of both wind alternatives, resulting in a true wind-on-wind comparison. While the fixed cost of the capacity adder is the same for both alternatives, when that is converted to an energy cost by dividing by the MWh, the capacity adder is higher for the lower capacity factor alternative. Thus, removing more cost from the Illinois wind results in it having a competitive advantage.

Table 2

Wind-on-Wind Comparisons

Generation Type	Kansas Wind	Illinois Wind
CF	52.00%	40.00%
Capacity Costs	\$35.81	\$46.56
Property Taxes	\$2.15	\$10.81
Annual Expenses	\$7.90	\$10.26
DC Transmission	<u>\$21.49</u>	\$0.00
DC Losses	<u>\$3.54</u>	\$0.00
Total Lev \$/MWh	<u>\$70.89</u>	\$67.63